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Identification of shallow Al donors in ZnO

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Abstract

A combined magnetic resonance, photoluminescence, photoconductivity, and Raman scattering study of ZnO is presented. Electron paramagnetic resonance (EPR) and electron-nuclear double resonance (ENDOR) spectroscopy identify substitutional Al as a binding core of a shallow, effective-mass-like donor in ZnO. Based on the correlation between the EPR and photoluminescence data it is shown that recombination of an exciton bound to Al gives rise to the 3360.7meV photoluminescence line (I 6). A 1s→ 2p donor transition at 316cm -1 is detected in photoconductivity and Raman spectra. © 2011 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

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Keywords

Aluminum, ENDOR, EPR, ZnO